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ABSTRACT

This document contains a detailed listing of topics covered in the mathematics and reading portions of the 1973 Form S and the 1981 Form U of the Comprehensive Tests of Basic Skills (CTBS). Changes in the overall structure of the CTBS, new topics included in Form U and old topics not covered, and changes in the arrangement of topics across the different test levels are discussed. Form U has more levels than the older Form S; there is not a one-to-one correspondence between test levels in CTBS and grade levels in school. On the reading tests, the most prominent change is a fairly large increase in the number of skill areas and topics that are tested. On the mathematics tests, two patterns are evident: (1) there are more skill areas and more topics covered by the newer test; and (2) the skills are organized differently across the test levels. (Author/BW)

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HOW A STANDARDIZED ACHIEVEMENT TEST ADAPTS TO THE TIMES: A TOPICAL COMPARISON OF MATHEMATICS AND READING TESTS ON THE 1973 AND 1981 FORMS OF THE COMPREHENSIVE TESTS OF BASIC SKILLS

Ann Mattson, Jannine Perkins, and Aaron Buchanan

ABSTRACT

This document contains a detailed listing of topics covered in the mathematics and reading portions of the 1973 Form S and the 1981 Form U of the Comprehensive Tests of Basic Skills. Changes between Form S and Form U in the tests and the topics they include are discussed.

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HOW A STANDARDIZED ACHIEVEMENT TEST ADAPTS TO THE TIMES: A TOPICAL COMPARISON OF MATHEMATICS, READING AND LANGUAGE TESTS ON THE 1973 AND 1981 FORMS OF THE COMPREHENSIVE TESTS OF BASIC SKILLS

Ann Mattson, Jannine Perkins and Aaron Buchanan

When a standardized achievement test is updated, the most obvious change is that the test is re-normed. Any gains or declines in achievement that may have occurred in the interim are recalibrated to establish the "average" at the 50th percentile, and other normative equivalents are established accordingly. Because these indicators are the prime basis for interpreting standardized test scores, changes in the structure and the substance of the test tend to attract less attention and frequently go unnoticed. However, over time the views of the structure and substance of what constitutes a "subject" and a "skill" change.

The purpose of the present analysis was to see how such changes are reflected and operationalized in the updating of a given test battery. Although "teaching to a test" is not condoned, teaching that is not sensitive to the structure and substance of a test is not competent. The information provided by the analysis is relevant for facilitating professional practice in this regard.

In the main, this document contains a detailed listing of topics covered in the mathematics and reading portions of Forms S and U of the Comprehensive Tests of Basic Skills (CTBS), two sets of very widely-used tests developed and published by CTB/McGraw-Hill. Form S was first published in 1973 and is now gradually being replaced by Form U which was first published in 1981. Each form was developed to measure what

students know about the basic skills that schools typically cover between kindergarten and grade 12. Since schools have ostensibly increased their emphasis on basic skills over the past ten years, we would expect to see some corresponding changes between Forms S and U in the topics that are covered by CTBS.

In order to see some of the changes that have occurred between Forms S and U, we have organized information about these two forms in several different ways. Keep in mind that each form of CTBS consists of several test booklets, each intended for students at a different grade level. Within each booklet, there are several tests of different areas of subject matter. Our concern was with the mathematics and reading tests that are provided at each level of CTBS. With this in mind, we have organized the information about topics covered in Forms S and U around three questions:

1. What changes, if any, have been made in the overall structure of CTBS? How do the separate test booklets or "levels" of CTBS match up with grade levels in school?
2. What new topics are tested in Form U and what old ones are not?
3. How has the arrangement of topics across different "levels" of CTBS changed between Forms S and U?

Changes in the "Levels" Structure. Form U has more "levels" than the older Form S. Each level in CTBS is really a separate test booklet intended for students who have reached a certain grade level in school; each test booklet consists of several tests; each test covers a different kind of subject matter; and the items on each test are supposed to represent basic skills that students will have had an opportunity to learn by the time they reach the grade level in school for which the test booklet (also known as test level) is designated.

There isn't a one-to-one correspondence between test levels in CTBS and grade levels in school. Form S has five levels that reach from the beginning of kindergarten up through grade 6.9 (the ninth month of grade 6) while Form U has seven levels covering this same range of grades in school.¹ The organization of levels for both forms is shown in Table 1. Except for Level G, whose use is appropriate from the end of grade 4 through the end of grade 6, Form U comes fairly close to having a separate test level for each grade in school. The main difference in the arrangement of levels for the two forms occurs at grades 3 and 4 where Form U has two levels but Form S has only one. Form U also has an additional level in the period from kindergarten through the end of grade 1, which seems designed to reduce the large overlap in grade ranges for which levels A and B of Form S were appropriate.

¹There is another, higher level of each form that could be used during the last two or three months of grade 6, but it seems more appropriate for students who are in grades 7 or 8.

Table 1

DESIGNATED GRADES FOR LEVELS OF CTBS FORMS S AND U

	K	1	2	3	4	5	6	7
FORM S LEVELS	○-----A-----○	○-----B-----○	○-----C-----○	○-----1-----○	○-----2-----○	○-----3-----○	○-----4-----○	○-----5-----○
FORM U LEVELS	○---A---○	○---B---○	○---C---○	○---D---○	○---E---○	○---F---○	○---G---○	○---H---○

Changes in the "Tests" Structure. In the early grades some changes have occurred in the tests that make up each level. These changes are shown in Table 2. The table is organized so that levels of each form that have about the same test "titles" are listed opposite each other. This does not always mean that levels which are listed across from one another are intended for use at the same grade levels. For example, Levels D and E of Form U have about the same test titles as Level C in Form S, but together they cover most of grades 2 and 3 while Level C in Form S covers mainly grade 2. As one can see, most of the changes in the "Tests" structure have been made in the levels of CTBS intended for kindergarten and grades 1 and 2. Levels A and B of Form S have more tests than Levels A, B, and C of Form U. For example, Form S has two mathematics tests at Levels B and C while Form U only has one. The structure of reading² tests at Levels A and B has been greatly simplified in Form U. Instead of the six tests in reading found in Level A of Form S, there are four reading tests in Level A of Form U. At Level B, the number of reading tests has been reduced from six to four.

²There is some overlap of reading tests with language tests in the levels of Forms S and U that are intended for use in kindergarten. Mostly, it's a case where language tests contain some parts that are considered reading. To a lesser extent some reading tests for kindergarten contain items that would also be appropriate for language tests. Beyond kindergarten, the levels of CTBS in both Form S and Form U make fairly clear distinctions between tests for reading and language.

Table 2

SUBJECT MATTER TESTS IN CTBS FORMS S AND U

<u>FORM S</u>	<u>FORM U</u>
<u>LEVEL A (K.0-1.5)*</u>	<u>LEVEL A (K.0-K.9)</u>
Letter Forms	Visual Recognition
Letter Names	Sound Recognition
Listening for Information	Vocabulary
Letter Sounds	Oral Comprehension
Visual Discrimination	Mathematics Concepts and Applications
Matching	
Language	
Mathematics	
<u>LEVEL B (K.5-1.9)</u>	<u>LEVEL B (K.6-1.6)</u>
Letter Sounds	<u>LEVEL C (1.0-1.9)</u>
Word Recognition I	Word Attack
Reading Comprehension	Vocabulary
Word Recognition II	Oral Comprehension
Language I	Language Expression
Language II	Mathematics Concepts and Applications
Mathematics Concepts and Applications	
Mathematics Computation	
<u>LEVEL C (1.5-2.9)</u>	<u>LEVEL D (1.6-2.9)</u>
Reading Vocabulary	<u>LEVEL E (2.6-3.9)</u>
Reading Comprehension: Sentences	Word Attack
Reading Comprehension: Passages	Vocabulary
Language Expression	Reading Comprehension
Spelling	Spelling
Language Mechanics	Language Mechanics
Mathematics Computation	Language Expression
Mathematics Concepts and Applications	Mathematics Computation
Science	Mathematics Concepts and Applications
Social Studies	Science
	Social Studies

*Designated grade levels.

Table 2 (con't.)

<u>LEVEL 1 (2.5-4.9)*</u>	<u>LEVEL F (3.6-4.9)</u>
<u>LEVEL 2 (4.5-6.9)</u>	<u>LEVEL G (4.6-6.9)</u>
Reading Vocabulary	Vocabulary
Reading Comprehension	Reading Comprehension
Spelling	Spelling
Language Mechanics	Language Mechanics
Language Expression	Language Expression
Mathematics Computation	Mathematics Computation
Mathematics Concepts and Applications	Mathematics Concepts and Applications
Reference Skills	Reference Skills
Science	Science
Social Studies	Social Studies

*Designated grade levels.

Changes in Mathematics Tests. In order to see the changes that have occurred in mathematics content, we have classified each item in the various CTBS mathematics tests according to a template that includes the major skill areas that mathematics in the elementary grades typically covers. The template used for this analysis was a dictionary of mathematical skill areas and of the numerous mathematical topics that ordinarily make up these skill areas. This dictionary has been developed at SWRL as part of some analytical work that we have done on mathematics textbook series that are widely used in kindergarten through grade 6. Backing up the dictionary is a program for computer processing that makes it possible to sort through the classifications and to group together test items that have the same or similar classifications. The result is a profile of not only major skill areas but of the quite discrete topics that go together to make up a set of standardized tests.

Using this dictionary, every item on the mathematics tests of Levels B, C, 1, and 2 for Form S and Levels B through G for Form U was classified. Altogether, the analysis as shown in Table 3, covered 305 items on Form S and 361 items on Form U.

Table 3
NUMBER OF ITEMS ON MATHEMATICS TESTS IN FORMS S AND U

<u>Level</u>	<u>Form S</u>	
	<u>Mathematics Computation</u>	<u>Mathematics Concepts and Applications</u>
B	32	24
C	28	25
1	48	50
2	48	50

<u>Level</u>	<u>Form U</u>	
	<u>Mathematics Computation</u>	<u>Mathematics Concepts and Applications</u>
B	--	20
C	20	25
D	20	30
E	36	40
F	40	45
G	40	45

Changes in Mathematics Skill Areas. Using the SWRL-developed template, it is possible to lay out the major skill areas in mathematics that are covered in Forms S and U. These are shown in Table 4. The first section of this table shows skill areas that are represented in Form S but are not included in Form U; the second section shows skill areas that are represented in both forms; while the third shows skill areas that are new in Form U.

Changes in Reading Tests. The items on the CTBS reading tests were classified using the reading section of the SWRL dictionary described above. Then this item-by-item classification was sorted by the computer. Items having similar, or same, classifications were grouped together. The result is a profile of major skill areas and their component subskills.

Using this dictionary, every item of the reading tests on Form S (Levels B, C, 1, and 2) and Form U (Levels B through G) was classified. Altogether, the analysis covered 368 reading items on Form S and 549 reading items on Form U as shown in Table 5.

Changes in Reading Skill Areas. Using the SWRL-developed template, it is possible to lay out the major skill areas in reading that are covered on Forms S and U. These are shown in Table 6.

The first section of this table shows those skill areas that are represented in Form S but are not included in Form U; the second section shows skill areas that are represented in both forms; while the third section shows skill areas that are new in Form U.

Table 4

MATHEMATICS SKILL AREAS REPRESENTED IN
FORMS S AND U OF CTBS

Form S (only)

Coordinate Geometry
Statistics
Classification and Sets

Form S and U

Whole Number Recognition	Special Sets of Numbers
Fraction Recognition	Properties of Mathematical Systems
Whole Number Order and Comparison	Money
Fraction/Decimal Comparison	Time
Equivalent Fractions	Length
Addition/Subtraction Basic Facts	Liquid Capacity
Multiplication/Division Basic Facts	Area, Perimeter, etc.
Addition Algorithm	Geometry: Geometric Relationships
Subtraction Algorithm	Geometry: Two-Dimensional Shapes
Multiplication Algorithm	Logic
Division Algorithm	Equations
Addition/Subtraction of Fractions/Decimals	Graphs, Tables, Scale Drawings
Multiplication of Fractions/Decimals	Word Problems
Division of Fractions/Decimals	

Form U (only)

Prenumber Concepts
Integer Recognition
Rounding
Weight
Temperature
Functions

Table 5
NUMBER OF ITEMS ON READING TESTS
IN FORMS S AND U

<u>Form S</u>					
Level	Letter Sounds	Reading Vocabulary	Word Recognition 1/2	Reading Composition	Reference Skills
B	22	19/19	24		
C		33		23/18*	
1		40		45	20
2		40		45	20

*Reading comprehension: 23 = sentence, 18 = passage

<u>Form U</u>					
Level	Vocabulary	Oral Composition	Word Attack	Reading Composition	Reference Skills
B	17	15	32		
C	25		30	25	
D	25		40	25	
E	30		35	30	
F	45			45	20
G	45			45	20

Table 6

READING AREAS REPRESENTED IN
FORMS S AND U OF CTBS

Form S (only)

Consonant Digraphs and Clusters

Forms S and U

Single Vowels
Punctuation
Word Recognition, Spelling/Rhyming Patterns
Contractions
Word Meaning
Definitions, Synonyms, Homonyms
Single Sentence Intrasentence Meaning
Intrasentence/Paragraph Meaning
Recall of Contents
Sequence/Cause and Effect
Inferential Meaning
Main Idea/Supporting Detail/Topic
Elements of Narrative Structure
Stylistic Elements
Literary Style Type of Writing

Form U (only)

Single Consonants
Vowel Digraphs and Diphthongs
Vowel Affected by Following Consonant
Syllabication
Derivational Affixation
Compounds
Homophones, Homographs
Classifying/Part-Whole
Author's Intention and Purpose
Fiction/Fact/Opinion
Dictionary, Glossary, Encyclopedia, Alphabetizing,
Phonetic Spelling
Information Organizers

Changes in Topics (Reading and Mathematics)

Appendixes A (Reading) and B (Mathematics) show the arrangement of skill areas and topics across the levels of CTBS that would most likely be used with students from about the end of kindergarten through the end of grade 6. In each appendix, the data for Form S are shown first and are followed by data from Form U. Level A tests are not shown in the analysis for either form because they seem to be most appropriate for students who are somewhere near the beginning of kindergarten. For this analysis, we were more concerned with skill areas and topics that would be relevant to grades 1 through 6. Using this analysis it is possible to see more clearly the details of what is tested in each level of CTBS, and it is also possible to look up particular topics to see where and when they are tested in the schedules for Forms S and U.

Patterns seen in Changes

On the reading tests the most prominent change is a fairly large increase in the number of skill areas and topics that are tested. On Form S, we counted 26 topics in 15 skill areas; on Form U, the newer version, there are now 72 topics in 26 skill areas. Clearly, the newer version of the CTBS test includes a wider range of basic skills in its tests and is designed to touch on more of the basic skills that schools cover between kindergarten and grade 6.

On the mathematics tests, two patterns are evident. First, as is true of the reading tests, there are more skill areas and more topics

included in the newer Form U, but the increase is proportionately smaller. On Form S there were 175 topics in 30 skill areas while on Form U there are now 214 topics in 34 skill areas. While the number of topics in reading more than doubled, the number of topics tested in mathematics only increased about 20%. At a broader level, the number of skill areas increased by almost 60% in reading but only a little more than 10% in mathematics.

The second pattern seen on the mathematics tests is the organization of skills across tests. This pattern is best visualized by looking at the array of Xs in Appendix B. In this appendix, the topics within a skill area are ordered, as much as possible from less complicated to more complicated tasks. For example, in skill area, 111 (Whole Number Recognition) the topics are ordered by the size of the number (e.g., numbers to 10, numbers to 20, numbers to 99, numbers to 999, and numbers to 9,999) and in skill area, 151 (Addition Algorithm) the topics are ordered both by size of number and by number of steps involved in the computation (e.g., regrouping versus no regrouping). On Form S the Xs, which designate the test levels on which each particular topic is tested, are scattered. On Form U the Xs have a more step-like appearance with progression of the topics tested at each higher level moving quite obviously from less to more complicated skill components.

The differences between reading and mathematics in Form U as compared to Form S says a lot about the difference between reading and mathematics as areas of subject matter and the way they are spread across several grade levels in elementary school textbooks. Mathematics

instruction spends a lot of time on skills involved in recognizing numbers and performing computations. Consequently, most of the sequence that occurs from one grade level to another comes from development of small pieces of skills that eventually combine to form larger and larger skill complexes.

Reading gets some of its sequence from subskills that build on one another, especially with regard to decoding in the lower grades. More often, reading involves a skill that stretches across several grades, such as identifying synonyms, but has no strong subskills that are emphasized only at a single grade level.

In adding more reading tests, CTBS added new skills and topics that were not tested before. While new things were added, little was changed in the way skills build grade by grade except in one skill area, single sentence/intra sentence meaning, where Form U shows a very well defined pattern of cumulative skill development.

Adding more tests means something different in mathematics. Here, CTBS didn't add new topics so much as it added more test items to old topics. In addition, having more tests made it easier to align parts of skills with specific grade levels. In Form U, a specific mathematics subskill is much more likely to appear at only one level of CTBS than it was in Form S.

APPENDIX A

Reading

Reading Skills Assessed on CTBS Form S

	<u>B</u> <u>K-1</u>	<u>C</u> <u>1-2</u>	<u>1</u> <u>2-4</u>	<u>2</u> <u>4-6</u>
112 Consonant Digraphs and Clusters				
name pictures, match with initial consonant clusters	X			
211 Single Vowels				
underline medial vowel in picture name	X			
411 Contractions				
select contraction to fit sentence		X		
511 Word Meaning				
select picture to match sentence	X			
select word for picture	X			
select word to fit sentence		X	X	X
512 Definitions, Synonyms, Homonyms				
select meaning for underlined word	X			
given definition, select word		X	X	
select synonym			X	X
611 Single Sentence/Intra Sentence Meaning				
select picture to match sentence	X			
select sentence to match picture	X			
select phrase to fit sentence			X	
given three sentence, underline two expressing same idea				X
612 Intrasentence/Paragraph Meaning				
given sentence in paragraph, select meaning				X

	<u>B</u> <u>K-1</u>	<u>C</u> <u>1-2</u>	<u>1</u> <u>2-4</u>	<u>2</u> <u>4-6</u>
711 Recall of Contents				
select answer to wh- questions		X	X	X
recall through questioning			X	X
713 Sequence				
mark first event			X	X
number statements in order				X
714 Inferential Meaning				
select conclusion				X
715 Main Idea/Supporting Detail/Topic				
given paragraph, select main idea			X	X
811 Elements of Narrative Structure				
select terms describing character/				X
select mood				X
812 Stylistic Elements				
select paraphrase for figure of				
speech			X	X
select meaning of descriptive				
sentence				X
813 Literary Style/Type of Writing				
answer questions about poetry			X	X

Reading Skills Assessed on CTBS Form U

	<u>B</u> <u>K-1</u>	<u>C</u> <u>1</u>	<u>D</u> <u>1-2</u>	<u>E</u> <u>2-3</u>	<u>F</u> <u>3-4</u>	<u>G</u> <u>4-6</u>
111 Single Consonants						
underline words with target consonants	X	X	X			
211 Single Vowels						
mark picture with target vowel medial vowels	X					
underline letters named by teacher		X	X	X		
212 Vowel Digraphs and Diphtongs						
VCe				X	X	
ee, ea, ei, ey, oa, ou, ow, oo,						
au, aw, ai, ie, oe				X	X	
given target word, select word with same vowel sound				X		
213 Vowel affected by Following Consonant						
ear, air, are					X	
Vr					X	
312 Syllabication, Stress						
mark number of syllables				X		
select word containing schwa					X	
313 Word Recognition						
given word orally, select written word	X	X				
411 Contractions						
match contraction with its two words					X	

	<u>B</u> K-1	<u>C</u> 1	<u>D</u> 1-2	<u>E</u> 2-3	<u>F</u> 3-4	<u>G</u> 4-6
413 Derivational affixation						
select base or affixed form		X	X		X	X
underline root			X			
adjective suffixes				X		
Prefixes				X		
414 Compounds						
given word, select another word to form compound			X			
select compound from word list				X		
511 Word Meaning						
select word to fit sentence				X		
512 Definition, Synonyms, Homonyms						
select sentences where meaning of underlined word is the same	X					
select one word for two phrases					X	
match synonyms	X					
given definition, select word		X				
select synonyms for underlined word		X	X	X	X	X
select word to fit two sentences				X		
514 Homophones, Homographs						
select word to fit sentence				X		
611 Single sentence/Intrasentence Meaning						
select picture to match sentence	X					
sentence completion	X					X
identifying question made from given statement	X		X			
select sentences as meaning carriers			X			
select suitable ending for sentence beginning			X			
identify subject of sentence				X	X	
identify verb of sentence				X	X	
combine sentences					X	X
given three sentences underline two expressing same meaning						X
given sentences, explain meaning						X

	<u>B</u> <u>K-1</u>	<u>C</u> <u>1</u>	<u>D</u> <u>1-2</u>	<u>E</u> <u>2-3</u>	<u>F</u> <u>3-4</u>	<u>G</u> <u>4-6</u>
612 Intrasentence/Paragraph Meaning						
given paragraph, questions, select answers			X			
cloze					X	X
given paragraph determine sentence which doesn't belong						X
711 Recall of Contents						
recall through picture	X					
recall through questioning		X	X		X	X
answer wh- questions			X	X	X	X
infer feelings				X		X
712 Classifying/Part-Whole						
cross out word that doesn't fit		X				
713 Sequence/Cause and Effect						
what happened first	X					
what happened last			X			
number in sequence					X	X
given effect, select cause					X	X
714 Inferential Meaning						
read paragraph, answer questions	X	X				
prediction	X		X	X	X	
infer feeling						X
select statement that judges situations					X	X
715 Main Idea						
select title for story			X	X	X	X
given paragraph, select main idea			X	X	X	X
select topic sentence					X	X

	<u>B</u> <u>K-1</u>	<u>C</u> <u>1</u>	<u>D</u> <u>1-2</u>	<u>E</u> <u>2-3</u>	<u>F</u> <u>3-4</u>	<u>G</u> <u>4-6</u>
811 Elements of Narrative Structure						
answer questions about character					X	X
812 Stylistic Elements						
choose reasons for exaggeration					X	
813 Literary Style/Type of Writing						
complete sentences about poems						X
815 Author's Intention and Purpose						
select author's purpose					X	X
817 Fiction/Fact/Opinion						
fact/fantasy				X	X	X
fact/opinion					X	X
911 Dictionary, Glossary, Encyclopedia, Alphabetizing, Phonetic Spelling						
run-on sentences					X	X
dictionary/glossary					X	X
pronunciation key					X	X
word meaning					X	X
card catalogue					X	
alphabetize						X
choose reference book						X
912 Information Organizers						
table of contents					X	X
title page					X	X
index						X

APPENDIX B

Mathematics

MATHEMATICS SKILLS ASSESSED ON CTBS FORM 5

	B K-1	C 1-2	1 2-4	2 4-6
111 Whole Number Recognition				
numbers to 10, identify ordinal number for position	X		X	
identify equivalent ordinal number forms (2nd, second)			X	
match word form to set	X			
numbers to 20, match standard number to set	X			
match word form to set		X		
identify place value			X	
identify standard number for word form			X	
numbers to 99, identify expanded form for oral word form	X			
numbers to 999, identify place value		X		
identify standard number for word form			X	
identify standard number for expanded form			X	
numbers to 9,999, identify standard number for word form				X
112 Fraction Recognition				
identify fractional part of a whole number ($1/3$ of 6)		X	X	X
give fraction for part/whole relationship		X	X	X
give place value of digit in a decimal				X
121 Whole Number Order and Comparison				
numbers to 10, identify set with same number of members				X
identify how many more in one set than another				X
identify set with more or fewer				X
numbers to 20, complete skip counting sequence	X		X	
numbers to 100, identify number that is smallest/largest	X			
complete regular counting sequence	X			
complete skip counting sequence		X		X
numbers to 999, identify number closest to a specified number			X	
complete backward skip counting sequence				X
numbers to 99,999, identify which number is greater than a specified number			X	
compare numbers using symbols ($<$, $>$, $=$)				X
122 Fraction Comparison				
identify greatest/smallest of four unit fractions				X
123 Equivalent Fractions				
continue a sequence of equivalent fractions				X

141 +/- Basic Facts	B K-1	C 1-2	1 2-4	2 4-6
to 10, (+) identify equation that is correct	X			
vertical	X			
to 18, equation	X	X		
vertical		X		
identify equation for which the difference (sum) is that specified	X		X	
in the item				
identify equation that is correct	X	X		
identify equation in which missing number is that specified in	X			
in item				

142 x/: Basic Facts				
x to 5, equation		X	X	
with 1		X		
with 0			X	
vertical		X		
x to 9, with 5 as a factor		X		
vertical			X	
: to 5			X	
with 1			X	
: to 9			X	
equation				X

151 Addition Algorithms				
numbers to 9, three or more addends	X	X	X	
2-digit numbers, 2-digit + 1-digit, no regrouping	X	X		
2 digit + 2 digit multiple of 10, no regrouping	X	X		
2 digit + 2 digit, no regrouping	X	X	X	
2 digit + 1 digit, with regrouping	X	X	X	X
2 digit + 2 digit, with regrouping		X	X	X
three or more addends		X	X	
identify number line model showing 2 digit + 1 digit		X		
3-digit numbers, two addends		X	X	
three addends				X
4-digit numbers, two addends				X
three or more addends			X	X

152 Subtraction Algorithms

	B K-1	C 1-2	1 2-4	2 4-6
2-digit numbers, two 2-digit multiples of 10	X			
2 digit - 1 digit, no regrouping	X	X	X	
2 digit - 2 digit, no regrouping	X	X	X	
2 digit - multiple of 10, no regrouping			X	
2 digit - 1 digit, with regrouping	X	X		
2 digit - zero	X			
3-digit numbers, 3 digit - 2 digit, no regrouping		X	X	
3 digit - 3 digit, no regrouping		X	X	X
3 digit multiple of 100 - 1 digit			X	
3 digit - 3 digit, with regrouping			X	X
two 3 digit multiples of 10, with regrouping				X
4-digit numbers, 4 digit - 3 digit, with regrouping				X
zero in minuend				X

153 Multiplication Algorithms

1-digit multiplier, 10 as multiplicand			X	
2-digit multiplicand, no regrouping			X	
2-digit multiplicand, regrouping			X	X
3-digit multiplicand, no regrouping				X
3-digit multiplicand, regrouping			X	X
3-digit multiple of 100 as multiplicand				X
4-digit multiplicand				X
2-digit multipliers, 2-digit multiplicand				X
3-digit multipliers, 3-digit multiplicand				X

154 Division Algorithms

1-digit divisor, 2-digit quotient, no remainder			X	X
3-digit quotient				X
2-digit quotient with zero, remainder				X
4-digit quotient that is a multiple of 1000				X
2-digit divisor, 1-digit quotient			X	X
divisor a multiple of 10; dividend a multiple of 10			X	

155 +/- Fractions/Decimals

mixed number + or - whole				X
mixed number				X
fraction + fraction with 1 as sum (like denominators)				X
fraction - fraction with like denominators				X
decimal in tenths + or - decimal in tenths				X
add four decimals in hundredths				X

	B K-1	C 1-2	1 2-4	2 4-6
156 x Fractions/Decimals				
fraction x fraction, no simplifying				X
x whole number				X
x itself (unit fraction)				X
decimal in hundredths x whole				X
157 : Fractions/Decimals				
fraction : itself				X
unit fraction : whole number				X
decimal in hundredths : 2-digit whole number				X
191 Special Sets of Numbers				
identify odd/even numbers			X	
193 Properties of Mathematical Systems				
commutative property, complete exercise showing property			X	
associative property, complete exercise showing property			X	
210 Money				
give value of coin sets to dime	X			
to quarter		X		
identifying coins equal to a quarter	X			
to a dime		X		
equivalent to given coin			X	
add money values, no regrouping		X		
with regrouping			X	X
subtract money values				X
multiply money values				X
divide money values				X
identify change from purchase		X		
select smallest number of coins equal to a given value			X	
give \$ form for word form			X	X
220 Time				
identify clock that shows orally given time, half hour	X		X	
read calendar, ordinal numbers/day of week		X		
give date one week after, calendar			X	X
tell time on clock face, 15 minutes after		X		
five minute intervals		X		
identify time two hours later, elapsed time		X		X

	B K-1	C 1-2	I 2-4	2 4-6
250 Length				
identify object which is specified length, ruler shown	X			
exchange metric length measurement units			X	
English length measurement units			X	X
identify line segment one inch longer, ruler shown			X	
one inch shorter, ruler shown				X
identify longest measure, ft./in. combinations				X
250 Liquid Capacity				
identify appropriate English liquid capacity unit		X		
exchange English liquid capacity units				X
280 Area, Perimeter, Etc.				
area, square inch units of measurement				X
312 Geometry: 2 Dimensional Shapes				
identify 2-dimensional shapes by class name			X	X
parts of 2-dimensional shapes by class name, center of circle			X	
diameter of circle				X
parts of rectangle			X	
subclasses of shapes by name, equilateral triangle				X
open/closed figures				X
321 Geometry: Geometric Relationships				
identify points inside/outside/on			X	
323 Coordinate Geometry				
identify coordinates of a point				X
410 Statistics				
identify method for calculating average				X
information needed for calculating average				X
510 Classification and Sets				
give number of members in empty set			X	
count number of members in given set				X
identify union of 2 sets				X

520 Logic

B	C	1	2
K-1	1-2	2-4	4-6

A) B; C (A: who is shortest)

X

620 Equations

identify which subtraction has B as its missing "addend"

X

solve addition basic fact equation

X

two addition basic fact equations

X

one addition/one subtraction basic fact equation(s)

X

X

two unknowns, both values given, give sum

X

multiplication (with unknown) equal addition (with unknown)

X

multiplication (with unknown) equal 10 x 1-digit number

X

identify set of numbers that make inequality true

X

710 Graphs, Tables, Scale Drawings

read circle graph

X

point/line graph

X

scale drawing

X

720 Word Problems Involving:

basic facts, addition: select correct set as answer (oral)

X

X

X(w)

take away subtraction: select correct set (oral)

X

addition: identify correct sum (oral)

X

addition: identify expression that solves (oral)

X

multiplication, identify product

X

division, how many to each

X

X

three, 1-digit addends: identify sum (oral)

X

2-digit addends

X

1-digit minus 1-digit, no regrouping, "not" subtraction (oral)

X

take away subtraction

X

multistage computations: identify operations needed

X

addition/comparison subtraction

X

X

fraction of a whole number and "not" subtraction

X

missing addend, 2-digit numbers

X

equal ratios

X

multiplication, identify how to solve

X

logic, $N+(N-1) = 17$; or $N+4$, N , $N-3$ who has least

X

giving fraction for relationship

X

computation of sales tax

X

division, rate in mph

X

multiplication of money values

X

MATHEMATICS SKILLS ASSESSED ON CTBS FORM U

100 Prenumber Concepts

Identify object that does not belong
with ball "below"
Identify how many "above"

B	C	D	E	F	G
K-1	1	1-2	2-3	3-4	4-6
X					
X					
X					

111 Whole Number Recognition

numbers to 10, identify ordinal number
to 20, identify standard number, for word form
to 99, identify standard number, for word form
numbers to 10, identify standard number, for word form
identify set for word form
to 99, identify place value
numbers to 99, give standard for expanded form, vs
to 999, give standard for word form
give standard for expanded form
identify place value
numbers to 999, give standard number for place value model
to 999, give expanded form, vs
identify place value
to 99,999, identify place value
numbers to 99,999, give word form
to 999,999, identify place value
to millions, give standard for word form
numbers to 99,999, give expanded form
to millions, identify place value
to billions, identify periods in a numeral

X	X	X			
X	X	X			
X	X				
	X				
	X				
		X			
			X		
				X	
				X	
				X	
				X	
					X
					X

112 Fraction Recognition

give ratio for relationship
fraction for part/whole relationship
decimal, 1-place, for point on number line
give mixed number for part/whole relationship
decimal, 2-place, for part/whole relationship
identify fraction equal to specified whole number

				X	
				X	
				X	
					X
					X
					X

113 Integer Recognition

use integer to express loss

X

121 Whole Number Order and Comparison

numbers to 10, complete a counting sequence
 select set with same number of members
 give number just before
 select set with fewest
 select set with one more
 to 20, identify correct counting sequence
 numbers to 10, select set with relationship 3 to 1
 to 100, give number just after
 give number between
 identify greatest of 4 numbers
 numbers to 10, complete skip counting sequence
 to 20, give number just before
 to 100, select number less than
 give number that correctly completes () expression
 to 999, give number 1 more
 identify greatest of 4 numbers
 numbers to 10, compare using symbols, addition expression

B	C	D	E	F	G
K-1	1	1-2	2-3	3-4	4-6
X					
X					
X					
X					
X					
X					
	X				
	X				
	X				
	X				
		X			
		X			
		X			
		X			
		X			
			X		
			X		
				X	
					X

122 Fraction/Decimal Comparison

compare fractions with like denominators (4)
 compare fractions with unlike denominators
 identify decimal "more" than a specified decimal

X
 X
 X

123 Equivalent Fractions

identify common factors of numbers in two fractions

X

141 +/- Basic Facts

to 10, vertical
 equation
 to 13,
 to 18, give missing addend

X
 X
 X
 X

142 x/- Basic Facts

x to 5, vertical
 equation
 with 0
 give missing factor
 give equation for set model
 to 9, with 2 as a factor

X
 X
 X
 X
 X
 X

142 x/- Basic Facts (con't.)

- to 5
- to 9, with 2, 3 or 5
- x to 9, with 4
- to 9, with 4
- give missing factor/quotient in related equations
- to 9, identify

B	C	D	E	F	G
K-1	1	1-2	2-3	3-4	4-6
			X	X	
			X		
				X	
				X	
				X	
					X

151 Addition Algorithms

- numbers to 9, three addends
- 2-digit numbers, two addends, no regrouping
- 2-digit + 1-digit, with regrouping
- 3-digit numbers, two addends, multiples of 100
- two addends, no regrouping
- 2-digit numbers, two addends, with regrouping
- 4-digit numbers, two addends, no regrouping
- 3-digit numbers, two addends, 1 regrouping
- three addends, with regrouping
- 2-digit numbers, give missing addend
- 4-digit numbers, two addends, 2 or 3 regroupings
- three addends, with regrouping
- 5-digit numbers, three or more addends

X	X				
X	X		X		
X	X				
X	X				
	X	X			
	X				
			X	X	
			X	X	
			X		
				X	
				X	X
					X

152 Subtraction Algorithms

- 2-digit numbers, no regrouping, 2-digit - 1-digit
- multiples of 10
- two 2-digit, with regrouping
- with zero
- 3-digit numbers, no regrouping
- 4-digit numbers, no regrouping
- 2-digit numbers, give missing addend
- 3-digit numbers, multiple of 100 - 1 digit
- with zero
- with 1 regrouping
- 4-digit numbers, with 1 regrouping
- with regroupings
- multiples of 10, with regrouping
- 5+ digit numbers, with regroupings

X	X	X			
X	X				
	X	X			
	X	X			
	X	X			
		X		X	
			X		
				X	
				X	
					X
				X	X
					X

153 Multiplication Algorithms

- 1-digit multiplier, 10 or multiple as multiplicand
- 2-digit multiplicand, no regrouping
- 3-digit multiplicand, no regrouping
- with regrouping

X	X
X	X
	X
	X

153 Multiplication Algorithms (con't.)

B	C	D	E	F	G
K-1	1	1-2	2-3	3-4	4-6

- 4-digit multiple of 1000 as multiplicand
- 2-digit multiplicand, with regrouping
- 3-digit multiple of 100 as multiplicand
- 2-digit multiplier, two 2-digit multiples of 10
- two 2-digit, no regrouping
- 3-digit by 2-digit multiple of 10

X	
	X
	X
	X
	X

154 Division Algorithms

- 1-digit divisor, basic facts with remainder
- 2-digit multiple of 10 as dividend, no remainder
- 3-digit quotient with/without zero
- 4+ digit quotient
- 2-digit divisor, 1-digit quotient
- divisor multiple of 10, 1, 2 or 3 digit quotient, no remainder
- 1 or 2 digit quotient
- 3+ digit quotient, no remainder

X	
X	
X	X
	X
X	
	X
	X
	X

155 +/- Fractions/Decimals

- decimals, + two decimals in hundredths
- + decimals in tenths, equation
- decimals in tenths, some equation
- mixed numbers, + with like denominators
- with like denominators
- with unlike denominators
- decimals, + two decimals in thousandths
- + ragged decimals, includes equation
- decimals and mixed numbers, +/-

X	
X	
X	X
	X
X	X
	X
	X
	X
	X

156 x Fractions/Decimals

- decimal x whole
- decimal x decimal
- mixed fraction x 1

X
X
X

157 - Fractions/Decimals

- decimal - 1-digit whole number
- fraction - itself

X	X
	X

	B	C	D	E	F	G
	K-1	1	1-2	2-3	3-4	4-6
161 Rounding						
to nearest 10 (2- or 3-digit)				X		
1000 (4-digit)					X	
decimal in hundredths to decimal in tenths						X
191 Special Sets of Numbers						
identify odd/even numbers				X	X	
2-digit number divisible by 4						X
193 Properties of Mathematical Systems						
commutative property, complete exercise showing				X	X	
associative property, complete exercise showing				X	X	
inverse operations, x/-						X
identity element						X
210 Money						
identify nickel	X					
dime (10 cents)	X					
give value of coin sets, to dime		X		X		
compute with money values, +/-			X	X	X	X
					X	X
give value of coin sets, to quarter			X			
select largest money values					X	
give c value for word form				X		
\$ value for word form					X	
220 Time						
tell time on clock face, to hour	X	X				
to half-hour			X			
to 5-minute intervals				X		
read calendar			X	X		
230 Length						
centimeter, measure length, ruler shown		X				
meter/centimeter, identify cm length less than m				X	X	
kilometer/meter, exchange length measurement units				X		X
half-inch, measure length, ruler shown				X		
mile, compare English length measurement units					X	
identify appropriate English length unit					X	
yard, exchange English length measurement units						X

	B	C	D	E	F	G
	<u>B-1</u>	<u>1</u>	<u>1-2</u>	<u>2-3</u>	<u>3-4</u>	<u>4-6</u>
240 Weight						
pound/ounce, compare weights						X
gram/centigram, exchange weight measurement units						X
250 Liquid Capacity						
gallon, identify English unit holding most				X		
liter/milliliter or liter/centiliter, exchange liquid capacity measurement units					X	X
liter, select appropriate unit					X	X
liter, centiliter, identify metric unit holding most						X
260 Temperature						
read temperature shown on thermometer					X	
280 Area, Perimeter, Etc.						
perimeter, count measurement units (2 of 4 sides shown)					X	
(1 of 3 equal sides shown)						X
area, count measurement units, includes partial units						X
312 Geometry: 2 Dimensional Shapes						
identify object most like rectangle	X					
given description, identify square		X				
identify rectangles in group of quadrilaterals			X			
squares in group of quadrilaterals			X			
identify parts of basic shapes, corner = point				X		
center of circle				X		
313 Geometry: 3 Dimensional Shapes						
identify cube			X	X		
cone				X		
pyramid						
cylinder (for drum)					X	X
sphere (for orange)					X	
identify parts of shapes, faces of prism					X	
321 Geometry: Geometric Relationships						
identify other half of object						
select object that fits geometric pattern of shape						

321 Geometry: Geometric Relationships (con't.)

identify shape that matches when folded on line
 recognize intersecting lines
 perpendicular lines
 parallel lines

B	C	D	E	F	G
K-1	1	1-2	2-3	3-4	4-6

X

X
 X
 X

520 Logic

A) B; B (C; So

X

610 Functions

complete function table, no rule shown

X

620 Equations

+ basic facts
 2 + basic fact expressions, give missing factor
 two computations, supply appropriate signs
 + algorithm
 x, find missing factor, two multiplication expressions
 - basic facts
 complete inequality, one number
 set of numbers

X X X

X
 X
 X

X
 X
 X
 X

710 Graphs, Tables, Scale Drawings

read pictographs
 bar graphs
 point/line graphs

X X

X
 X

X

720 Word Problems Involving:

basic facts, take away subtraction
 "more" addition
 "in all" addition
 "comparison" subtraction
 "not" subtraction
 x basic
 - basic, how many in each group
 algorithms, + in all addition
 + money values
 take away subtraction
 "not" subtraction
 identify operation needed, addition
 multiplication

X X X

X
 X

X

X

X X

X

X

X

X X

X

X

X

720 Word Problems Involving: (con't.)

multistage computations, +/-
 identify information necessary to compute product
 round/estimate multiplication/addition
 division, equal ratios
 add decimals
 unit fraction x whole

B	C	D	E	F	G
K-1	1	1-2	2-3	3-4	4-6
			X	X	X
					X
					X
					X
					X
					X